CLAIMS

What is claimed is:

1. A method of recovering anhydrous hydrogen fluoride from a mixture comprising hydrogen fluoride and a halogenated hydrocarbon comprising:

providing a mixture comprising hydrogen fluoride and at least one halogenated hydrocarbon; and

extracting hydrogen fluoride from said mixture by contacting said mixture with a solution of less than about 93 wt.% sulfuric acid solution in water.

2. The method of claim 1 wherein said sulfuric acid solution comprises from about 50 to about 90 wt% of sulfuric acid based on the total weight of the sulfuric acid solution.

3. The method of claim 1 wherein said sulfuric acid soluiton comprises from about 50 to about 85 wt% of sulfuric acid based on the total weight of the sulfuric acid solution.

4. The method of claim 1 wherein said sulfuric acid soluiton comprises from about 60 to about 85 wt% of sulfuric acid based on the total weight of the sulfuric acid solution.

5. The method of claim 1 wherein said sulfuric acid soluiton comprises from about 75 to about 85 wt% of sulfuric acid based on the total weight of the sulfuric acid solution.

6. The method of claim 1 wherein said sulfuric acid soluiton comprises about 80 wt% of sulfuric acid based on the total weight of the sulfuric acid solution.

7. The method of claim 1 wherein said halogenated hydrocarbon is selected from the group consisting of HFCs, HCFCs and mixtures of two or more thereof.

8. The method of claim 7 wherein said halogenated hydrocarbon is selected from the group consisting of 1,1,1,3,3-pentafluoropropane ("HFC-245fa"), 1,1,1,2-tetrafluoroethane ("HFC-134a"), pentafluoroethane ("HFC-125"), 1,1,1,3,3-pentafluorobutane ("HFC-365mfc"), 1,1,1-trifluoroethane ("HFC-143a"), 1,1,1,3,3,3-hexafluoropropane ("HFC-236fa"), difluoromethane ("HFC-32"), 1-chloro-1,2,2,2-tetrfluoroethane ("HCFC-124"), 1,1-dichloro-2,2,2-trifluoroethane ("HCFC-123"), chlorodifluoromethane ("HCFC-22"), and mixtures of two or more thereof.

9. The method of claim 7 wherein said halogenated hydrocarbon comprises 1,1,1,3,3-pentafluoropropane.

10. The method of claim 1 wherein said mixture comprising hydrogen fluoride and at least one halogenated hydrocarbon is a reaction product mixture obtained by reacting hydrogen fluoride with a chlorinated starting compound.

11. The method of claim 10 wherein said chlorinated starting compound is selected from the group consisting of 1,1,1,3,3-pentachloropropane, 1,1,1,2-tetrachloroethane, perchloroethylene, chloroform, 1,1,1,3,3-pentachlorobutane, 1,1,1,3,3,3-hexachloropropane, methylene chloride, and 1,1,1-trichloroethane.

12. The method of claim 10 wherein said chlorinated starting compound comprises 1,1,1,3,3-pentachloropropane.

13. The method of claim 1 wherein the HF extracted from said mixture in said

extraction step is further subjected to flash distillation to produce anhydrous HF.

14. The method of claim 1 wherein the HF extracted from said mixture in said extraction step is further subjected to flash distillation and column fractionation distillation to produce anhydrous HF.

15. The method of claim 1 wherein the anhydrous hydrogen fluoride produced contains less than about 200 ppm of sulfur impurities.

16. The method of claim 15 wherein the anhydrous hydrogen fluoride produced contains less than about 100 ppm of sulfur impurities.

17. The method of claim 16 wherein the anhydrous hydrogen fluoride produced contains less than about 75 ppm of sulfur impurities.

18. The method of claim 15 wherein the sulfuric acid layer obtained via the extraction step contains less than about 5000 ppm of TOC impurities.

19. The method of claim 15 wherein the sulfuric acid layer obtained via the extraction step contains less than about 3000 ppm of TOC impurities.

20. The method of claim 15 wherein the sulfuric acid layer obtained via the extraction step contains less than about 1000 ppm of TOC impurities.

21. A method of producing anhydrous hydrogen fluoride comprising:

providing a mixture comprising hydrogen fluoride and at least one halogenated hydrocarbon;

extracting hydrogen fluoride from said mixture with a solution of at least 98

wt.% sulfuric acid in water to provide an acid/HF mixture;

flash distilling said acid/HF mixture to provide a first HF product;

adding water to the first HF product to form a diluted HF mixture; and

distilling said diluted HF mixture to obtain anhydrous hydrogen fluoride.

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